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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/667,296	09/17/2003	David J. Power	061459 303139	8403

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TOWNSEND AND TOWNSEND AND CREW, LLP
TWO EMBARCADERO CENTER
EIGHTH FLOOR
SAN FRANCISCO, CA 94111-3834

EXAMINER	
HOUSE, LETORIA G	

ART UNIT	PAPER NUMBER
3672	

DATE MAILED: 05/23/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/667,296	POWER ET AL.	
	Examiner	Art Unit	
	Letoria House	3672	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-31* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-31* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *9/17/03* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *10142003 &01132005*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Drawings

1. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description: Reference number (14A) of Figure 1 is not referenced in the specification. Corrected drawing sheets in compliance with 37 CFR 1.121(d), or amendment to the specification to add the reference character(s) in the description in compliance with 37 CFR 1.121(b) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

2. The disclosure is objected to because of the following informalities: On page 6, line 30 of the Detailed Description there is a misspelled or misplaced word. The applicant references "the top drive 14 (ore Kelly/rotary table). The Examiner suggests that "ore" be replaced by "or." On page 11, line 5 of the Detailed Description the applicant references item (154) of Figure 3 as the" cable," the Examiner suggests that

the applicant clarify the nomenclature of item (154) as either the "brake control handle" as referenced on page 10, line 22 of the Detailed Description, or as the "cable" as noted above.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1, 4-8, 17-19, 21-29 are rejected under 35 U.S.C. 102(b) as being anticipated by Bowden (U.S. 5,474,142). Note Figures 1-2, column 4, lines 33-56, and column 10 lines 51-61.

With regard to claim 1, Bowden discloses an automatic drilling system (22) comprising an electric servo motor (204) operatively coupled to a winch brake control (32); a servo controller (33) operatively coupled to the servo motor (204); a drum position encoder (90) rotationally coupled to a winch drum (26) and operatively coupled to the servo controller (33), the servo controller (33) adapted to operate the servo motor (204) in response to measurements of position made by the encoder (90) so that a selected rate of rotation of the winch drum (26) is maintained.

With regard to claim 4, the reference discloses a selected rate of rotation related to a selected rate of axial motion of a drill string. (Column 4, lines 33-56; column 10, lines 51-61).

With regard to claim 5, the reference discloses a drilling fluid pressure sensor (34) operatively coupled to the servo controller (33), the servo controller adapted to control the rate of rotation so as to substantially maintain a predetermined drilling fluid pressure (Column 9, lines 49-51; column 10, lines 33-61).

With regard to claim 6, the reference discloses a bit weight sensor (35) operatively coupled to the servo controller (33), the controller adapted to control the rate of rotation so as to substantially maintain a predetermined axial force on a drill bit. (Column 4, lines 16-32; column 13, lines 48-67; column 14, lines 1-10).

With regard to claim 7, the reference discloses a logic switch (200-203) selectable to conduct one or more of a plurality of control signals to the servo controller, the control signals setting the selected rate of rotation. (Column 7, lines 17-23; column 20, lines 40-45).

With regard to claim 8, the reference discloses the system of claim 7, wherein the control signal comprises at least one of drilling fluid pressure, axial force on a drill bit, rate of penetration of a drill bit, wellbore inclination and wellbore azimuth. (Column 7, lines 17-23; column 20, lines 40-45).

With regard to claim 17, the reference discloses a system capable of performing the steps of: measuring a parameter related to rotational position of a drawworks drum; measuring a parameter related to operating position of a drawworks brake; determining

a rate of rotation of the drum from the rotational position related parameter measurement; and adjusting the operating position of the brake so as to substantially maintain the rate of rotation at a selected value. (Column 10, lines 51-61).

With regard to claim 18, the reference discloses an automatic drilling system comprising input means for setting a drawworks winch drum speed of rotation set point; means for controlling the speed of rotation of the drum to match the drum speed of rotation set point. (Column 10, lines 51-61).

With regard to claim 19, the reference discloses a means for controlling the speed of rotation that includes a brake handle (208).

With regard to claim 21, the reference discloses a means for controlling the speed of rotation which includes a servo motor (204) coupled to a brake handle (208). (Column 10, lines 51-61).

With regard to claim 22, the reference discloses a means for controlling the speed of rotation which includes a controller (33) coupled to a servo motor (204) and to an input means. (Column 4, lines 33-56; column 7, lines 17-23; column 10, lines 51-61; column 20, lines 40-45).

With regard to claim 23, the reference discloses a means (90) for determining the speed of rotation of a drawworks winch drum.

With regard to claim 24, the reference discloses a controller including a means for comparing the speed of rotation of the drawworks winch drum to a set point. (Column 7, lines 17-23; column 10, lines 51-61; column 20, lines 40-45).

With regard to claim 25, the reference discloses a controller including a control loop coupled to a means for comparing the speed of rotation of the drawworks winch drum to a set point. (Column 7, lines 17-23; column 10, lines 51-61; column 20, lines 40-45).

With regard to claim 26, the reference discloses an automatic drilling system comprising a control loop including a PID loop. (Column 7, lines 17-23; column 10, lines 51-61; column 20, lines 40-45).

With regard to claim 27, the reference discloses a system comprising: a servo motor (204) coupled to a drawworks winch drum brake actuator; means (90) for determining drawworks winch drum speed of rotation; and, means for controlling said servo motor based upon a difference between said drawworks winch drum speed of rotation and a speed of rotation set point (33). (Column 4, lines 33-56; column 7, lines 17-23; column 10, lines 51-61; column 20, lines 40-45).

With regard to claim 28, the reference discloses a means for determining the drum speed of rotation which includes a rotary encoder (90) coupled to the drawworks winch drum (26); and, means coupled to the rotary encoder for calculating the drawworks winch drum speed of rotation. (Column 4, lines 33-56; column 7, lines 17-23; column 10, lines 51-61; column 20, lines 40-45).

With regard to claim 29, the reference discloses a means for controlling a servo motor that includes a comparator for comparing the drawworks winch drum speed of rotation with the speed of rotation set point. (Column 4, lines 33-56; column 7, lines 17-23; column 10, lines 51-61; column 20, lines 40-45).

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1-4, 7, 17-29 are rejected under 35 U.S.C. 102(e) as being anticipated by Prior et al. (2004/0226748). Note Figure 1.

With regard to claim 1, Prior et al. discloses an automatic drilling system (50) comprising an electric servo motor (55) operatively coupled to a winch brake control (80); a servo controller (110) operatively coupled to the servo motor (55); a drum position encoder (100) rotationally coupled to a winch drum (26) and operatively coupled to the servo controller (110), the servo controller (110) adapted to operate the servo motor (55) in response to measurements of position made by the encoder (100) so that a selected rate of rotation of the winch drum (65) is maintained.

With regard to claim 2, the reference discloses an encoder comprising a sine/cosine output transducer (105). (Page 3, paragraph 0026).

With regard to claim 3, the reference discloses a winch brake operated by a winch brake control comprising a band brake. (Page 2, paragraph 0024).

With regard to claim 4, the reference discloses a selected rate of rotation related to a selected rate of axial motion of a drill string. (Page 3, paragraph 0026).

With regard to claim 7, the reference discloses a logic switch (102) selectable to conduct one or more of a plurality of control signals to the servo controller, the control signals setting the selected rate of rotation. (Page 3, paragraph 0026).

With regard to claim 17, the reference discloses a system capable of performing the steps of: measuring a parameter related to rotational position of a drawworks drum; measuring a parameter related to operating position of a drawworks brake; determining a rate of rotation of the drum from the rotational position related parameter measurement; and adjusting the operating position of the brake so as to substantially maintain the rate of rotation at a selected value. (Figure 2; Page 1, paragraph 0011; page 3, paragraph 0026, 0028, 0031).

With regard to claim 18, the reference discloses an automatic drilling system comprising input means for setting a drawworks winch drum speed of rotation set point; means for controlling the speed of rotation of the drum to match the drum speed of rotation set point. (Figure 2; Page 1, paragraph 0011; page 3, paragraphs 0026, 0028, 0030-0031).

With regard to claim 19, the reference discloses a means for controlling the speed of rotation that includes a brake handle. (Page 2, paragraph 0024).

With regard to claim 21, the reference discloses a means for controlling the speed of rotation which includes a servo motor coupled to a brake handle. (Page 2, paragraph 0024).

With regard to claim 22, the reference discloses a means for controlling the speed of rotation that includes a controller coupled to a servo motor and to an input means. (Page 3, paragraphs 0026, 0028, 0030).

With regard to claim 23, the reference discloses a means (100) for determining the speed of rotation of a drawworks winch drum. (Page 2, paragraph 0026).

With regard to claim 24, the reference discloses a controller including a means for comparing the speed of rotation of the drawworks winch drum to a set point. (Page 2, paragraphs 0028-0030).

With regard to claim 25, the reference discloses a controller including a control loop coupled to a means for comparing the speed of rotation of the drawworks winch drum to a set point. (Page 2, paragraphs 0028-0030).

With regard to claim 26, the reference discloses an automatic drilling system wherein the control loop includes a PID loop. (Page 2, paragraphs 0028-0030).

With regard to claim 27, the reference discloses a system comprising: a servo motor (55) coupled to a drawworks winch drum brake actuator; means (100) for determining drawworks winch drum speed of rotation; and, means for controlling said servo motor based upon a difference between said drawworks winch drum speed of rotation and a speed of rotation set point. (Page 2, paragraphs 0032).

With regard to claim 28, the reference discloses a means for determining the drum speed of rotation which includes a rotary encoder (100) coupled to the drawworks winch drum (65); and, means coupled to the rotary encoder for calculating the drawworks winch drum speed of rotation. (Page 2, paragraphs 0028-0031).

With regard to claim 29, the reference discloses a means for controlling a servo motor that includes a comparator for comparing the drawworks winch drum speed of rotation with the speed of rotation set point. (Page 2, paragraphs 0028-0031).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bowden (U.S. 5,474,142) alone. Bowden discloses an encoder with sufficient resolution to measure the rotational position of the drum. The Examiner notes that without any showing of criticality to provide an encoder with a resolution of about four million output increments per revolution of the drum, it would have been obvious to one skilled in the art at the time of the invention to provide an encode capable of relaying reasonable measurements of rotational position of the drum.

6. Claims 2, and 9-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bowden (U.S. 5,474,142) in view of Mattero (U.S. 5,458,207).

Bowden discloses an automatic drilling system as described above, however Bowden does not teach the system comprising a rate optimizer operatively coupled at an input thereof to at least one drilling operating parameter sensor, an output of the optimizer operatively coupled to the servo controller, the optimizer adapted to calculate a rate of axial motion of the drill string in response to measurements of the at least one drilling operating parameter, as recited in claim 9, or the encoder comprising a sine/cosine output transducer, as recited in claim 2.

Mattero teaches the use of a rate optimizer wherein drilling is adjusted by means of one or more adjustable parameters such as the rate of rotation of the drill string, where the measured parameters are correlated into a sine/cosine output. Mattero suggests that a rate optimizer is beneficial to maximize the penetration rate while drilling, to reduce equipment damage, and to reduce inferior drilling results. Therefore, it would have been obvious to one skilled in the art at the time of the invention to modify the automatic drilling system of Bowden to include the rate optimizer and sine/cosine measurement output of Mattero in order to a system for adjusting drilling parameters, which optimizes the penetration rate as efficiently and reliably as possible.

7. Claims 30 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bowden (U.S. 5,474,142) in view of Deng et al. (U.S. 6,246,343).

Bowden discloses an automatic drilling system comprising: a servo motor coupled to a drawworks winch drum brake actuator; means for determining drawworks winch drum speed of rotation; and, means for controlling said servo motor based upon a difference between said drawworks winch drum speed of rotation and a speed of rotation set point, as recited in claim 27.

Bowden does not teach the system recited in claims 30 and 31 wherein the means for controlling the servo motor includes a means for setting an angular position set point for a servo motor based upon a difference between the drawworks winch drum speed of rotation and the speed of rotation set point; and a means for determining the angular position of a servo motor; and means for comparing the angular position of the servo motor with the angular position set point, as recited in claims 30 and 31.

Deng et al. teaches an increment encoder error detection mechanism wherein the encoder senses rotational speed or position of a rotating portion of a machine. To detect speed, the rotating angle is divided by the time elapsed for the angle. The number of pulses determines the rotating angle. The direction of rotation is detected from the two pulse signals by employing a flip-flop means with an output indicative of rotation in one direction or the other. Deng et al. suggests that a two channel method of measuring angular position is beneficial so that the controller for the rotating member, the drum, can take action to prevent undesirable results. Therefore, it would have been obvious to one skilled in the art at the time of the invention to modify the automatic drilling system of Bowden to include the error detection mechanism of Deng et al. to

monitor the angular position to detect encoder failure and to prevent related equipment failure.

8. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bowden (U.S. 5,474,142) in light of Mattero (U.S. 5,458,207) as applied to claims 1 and 9 above, and in further view of Edwards et al. (U.S. 6,405,808).

Bowden discloses the invention substantially as claimed except Bowden does not teach a drilling parameter sensor comprising a sensor measuring a parameter to a wellbore trajectory that is optimized by an optimizer adapted to calculate a rate of axial motion of the drill string in response to measurements of at least one drilling operating parameter.

Edwards et al. teaches a system wherein the inclination and/or azimuth of the wellbore path at multiple wellbore survey stations is acquired with a MWD tool wherein substantially continuous inclination measurements of the wellbore are acquired by a MWD tool during drilling, periodic survey points are established along the wellbore with the MWD tool or other measurement tool static within the wellbore and then integrating the survey point measurements with the substantially continuous inclination measurements to achieve a highly accurate measurement of the spatial position of the wellbore. The signal can be electronically filtered to minimize the influence of drilling noise and thereby enhance the vitality of the resulting measurements. The embodiment is the approximation of highly accurate survey data with lower quality survey data in such a manner that the accuracy of the overall borehole trajectory is improved.

Therefore it would have been obvious to one skilled in the art at the time of the invention to modify the controller of Bowden to include the wellbore trajectory survey system of Edwards et al. to increase the efficiency of the drilling process by providing a system which accurately measures properties of the formation, the wellbore trajectory or the drilling processes while at the same time minimizing any requirements to suspend the drilling process.

9. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Prior et al. (2004/0226748) alone. Prior et al. discloses an encoder with sufficient resolution to measure the rotational position of the drum. The Examiner notes that without any showing of criticality to provide an encoder with a resolution of about four million output increments per revolution of the drum, it would have been obvious to one skilled in the art at the time of the invention to provide an encode capable of relaying reasonable measurements of rotational position of the drum.

10. Claims 2, and 9-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Prior et al. (2004/0226748) in view of Mattero (U.S. 5,458,207).

Prior et al. discloses the invention substantially as claimed, except Prior et al. does not teach the system comprising a rate optimizer operatively coupled at an input thereof to at least one drilling operating parameter sensor, an output of the optimizer operatively coupled to the servo controller, the optimizer adapted to calculate a rate of axial motion of the drill string in response to measurements of the at least one drilling

operating parameter, as recited in claim 9, or the encoder comprising a sine/cosine output transducer, as recited in claim 2.

Mattero teaches the use of a rate optimizer wherein drilling is adjusted by means of one or more adjustable parameters such as the rate of rotation of the drill string, where the measured parameters are correlated into a sine/cosine output. Mattero suggests that a rate optimizer is beneficial to maximize the penetration rate while drilling, to reduce equipment damage, and to reduce inferior drilling results. Therefore, it would have been obvious to one skilled in the art at the time of the invention to modify the automatic drilling system of Prior et al. to include the rate optimizer and sine/cosine measurement output of Mattero in order to a system for adjusting drilling parameters, which optimizes the penetration rate as efficiently and reliably as possible.

11. Claims 30 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Prior et al. (2004/0226748) in view of Deng et al. (U.S. 6,246,343).

Prior et al. discloses an automatic drilling system comprising: a servo motor coupled to a drawworks winch drum brake actuator; means for determining drawworks winch drum speed of rotation; and, means for controlling said servo motor based upon a difference between said drawworks winch drum speed of rotation and a speed of rotation set point, as recited in claim 27.

Prior et al. does not teach the system recited in claims 30 and 31 wherein the means for controlling the servo motor includes a means for setting an angular position set point for a servo motor based upon a difference between the drawworks winch drum

speed of rotation and the speed of rotation set point; and a means for determining the angular position of a servo motor; and means for comparing the angular position of the servo motor with the angular position set point, as recited in claims 30 and 31.

Deng et al. teaches an increment encoder error detection mechanism wherein the encoder senses rotational speed or position of a rotating portion of a machine. To detect speed, the rotating angle is divided by the time elapsed for the angle. The number of pulses determines the rotating angle. The direction of rotation is detected from the two pulse signals by employing a flip-flop means with an output indicative of rotation in one direction or the other. Deng et al. suggests that a two channel method of measuring angular position is beneficial so that the controller for the rotating member, the drum, can take action to prevent undesirable results. Therefore, it would have been obvious to one skilled in the art at the time of the invention to modify the automatic drilling system of Prior et al. to include the error detection mechanism of Deng et al. to monitor the angular position to detect encoder failure and to prevent related equipment failure.

12. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Prior et al. (2004/0226748) in view of Mattero (U.S. 5,458,207) as applied to claims 1 and 9 above, and in further view of Edwards et al. (U.S. 6,405,808).

Prior et al. discloses the invention substantially as claimed except Prior et al. does not teach a drilling parameter sensor comprising a sensor measuring a parameter to a wellbore trajectory that is optimized by an optimizer adapted to calculate a rate of

axial motion of the drill string in response to measurements of at least one drilling operating parameter.

Edwards et al. teaches a system wherein the inclination and/or azimuth of the wellbore path at multiple wellbore survey stations is acquired with a MWD tool wherein substantially continuous inclination measurements of the wellbore are acquired by a MWD tool during drilling, periodic survey points are established along the wellbore with the MWD tool or other measurement tool static within the wellbore and then integrating the survey point measurements with the substantially continuous inclination measurements to achieve a highly accurate measurement of the spatial position of the wellbore. The signal can be electronically filtered to minimize the influence of drilling noise and thereby enhance the vitality of the resulting measurements. The embodiment is the approximation of highly accurate survey data with lower quality survey data in such a manner that the accuracy of the overall borehole trajectory is improved.

Therefore it would have been obvious to one skilled in the art at the time of the invention to modify the controller of Prior et al. to include the wellbore trajectory survey system of Edwards et al. to increase the efficiency of the drilling process by providing a system which accurately measures properties of the formation, the wellbore trajectory or the drilling processes while at the same time minimizing any requirements to suspend the drilling process.

Conclusion

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Casso (U.S. 4,976,143) discloses an automatic drilling system. Peterson (U.S. 4,419,886) discloses an apparatus for indicating the change in position of a traveling block coupled to a wire line that is wrapped around a drum, comprising a motion pickup device responsive to the rotation of the drum. Milburn (U.S. 5,274,552) discloses a motion detector incorporated in a drilling rig for detecting drill string motion. Hobhouse (U.S. 3,550,697) discloses a drilling apparatus whereby to maintain optimum drilling speed, drilling fluid conditions, torque and weight-on-bit measurements are taken to control the hydraulic means of handling the drill string. Sokalski et al. (U.S. 5,709,285) discloses a brake for a hoisting apparatus, the system including a drum and a hoisting motor, wherein the braking system is controlled by a common controller for controlling the distribution of the braking power, and where the transmission can be connected to an autodriller for controlling the weight on bit. Gazel-Anthoine (U.S. 5,167,400) discloses a control device for drilling rig lifting winches wherein the drum rotation is maintained by controlling the electric motor. Silay et al. (U.S. 6,186,248) discloses a closed loop control system for a core drilling mechanism that automatically controls the penetration rate, the weight on the drill bit, and the torque load applied to the drill string based on pre selected values. Frink et al. (U.S. 4,875,530) discloses an automatic drilling system comprising a controller device and feedback signal wherein the rotational speed of the drum is maintained by monitoring the weight on the drill bit. Ray (U.S. 2003/0234119) discloses a drilling control system which utilizes improved

braking and feedback technology to provide more precise weight on bit control and more accurate feedback and control with respect to drilling depth, pipe transitions, and rate of penetration. Dhindsa (U.S. 5,713,422) discloses a motor continuously coupled to the drawworks to raise and lower a drill stem to continuously control the weight on bit at a desired value. Guggari (U.S. 6,029,951) discloses a brake arrangement connected to a rotatable drum for limiting the rotation of the rotatable drum and at least one electrical motor connected to the rotatable drum for driving the rotatable drum, wherein control of the rotation of the rotatable drum is transferred from the brake arrangement to the electrical motor upon a certain condition.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Letoria House whose telephone number is (571) 272-8118. The examiner can normally be reached on M-F, 7:00 A.M. - 4:00 P.M..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Bagnell can be reached on (571) 272-6999. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

David Bagnell
Supervisory Patent Examiner
Art Unit 3672

LGH